MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 3, 2016/2017

DCA5018 – ELECTRIC CIRCUIT

(DEE / DTE)

30 MAY 2017
2.30 p.m – 4.30 p.m
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This question paper consists of **5** pages with **4** questions.
2. Answer **ALL** questions. All necessary working steps must be shown.
3. Please write all your answers in the answer booklet provided.

QUESTION 1 [25 MARKS]

For the circuit shown in Figure 1, determine the following:

a) The total resistance. [4 marks]

b) Current I_1, I_2 and I_3 [8 marks]

c) Current flowing through each resistor [3 marks]

d) Voltage across each resistor. [6 marks]

e) Power dissipated at each resistor. [4 marks]

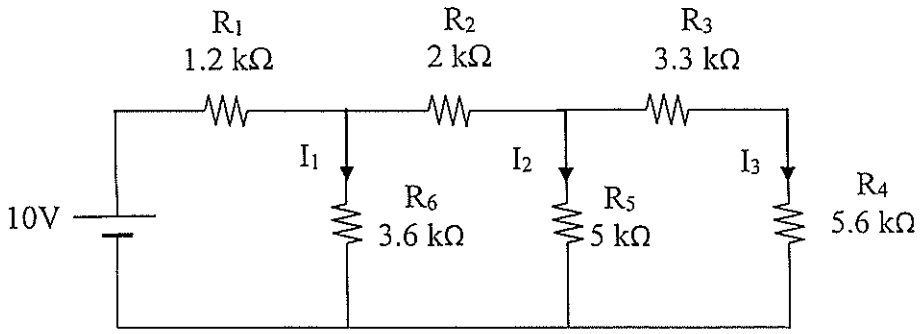

Figure 1

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QUESTION 2 [25 MARKS]

a) Referring to Figure 2, calculate the Norton equivalent resistance (R_N) and Norton equivalent current (I_N) as seen by R_L. [7 marks]

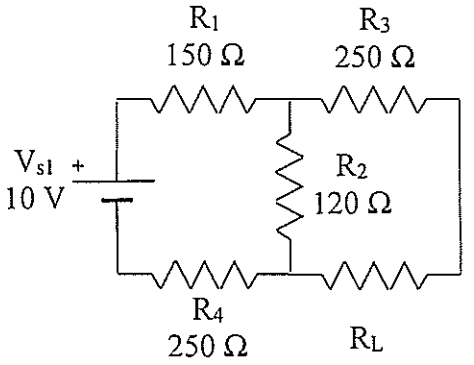

Figure 2

b) For the circuit shown in Figure 3, calculate the voltage drop at R_1 and R_2 using:

i) Branch Current Analysis. [9 marks]

ii) Nodal Analysis. [9 marks]

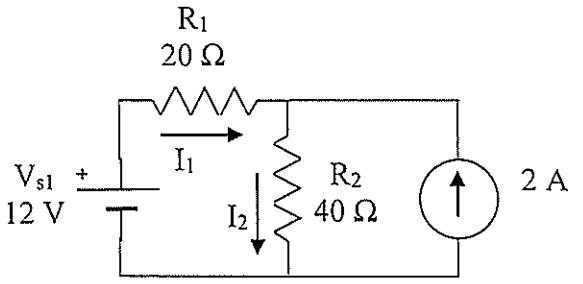

Figure 3

Continued...

QUESTION 3 [25 MARKS]

By referring to the RC circuit as shown in Figure 4 (i) and (ii):

a) Sketch the equivalent circuit in frequency domain. Given $v(t) = 50 \sin 200t$ V for both circuit.

[5 marks]

b) Calculate the total impedances in the circuit.

[5 marks]

c) Calculate the steady state current $i(t)$, $i_R(t)$ and $i_C(t)$.

[15 marks]

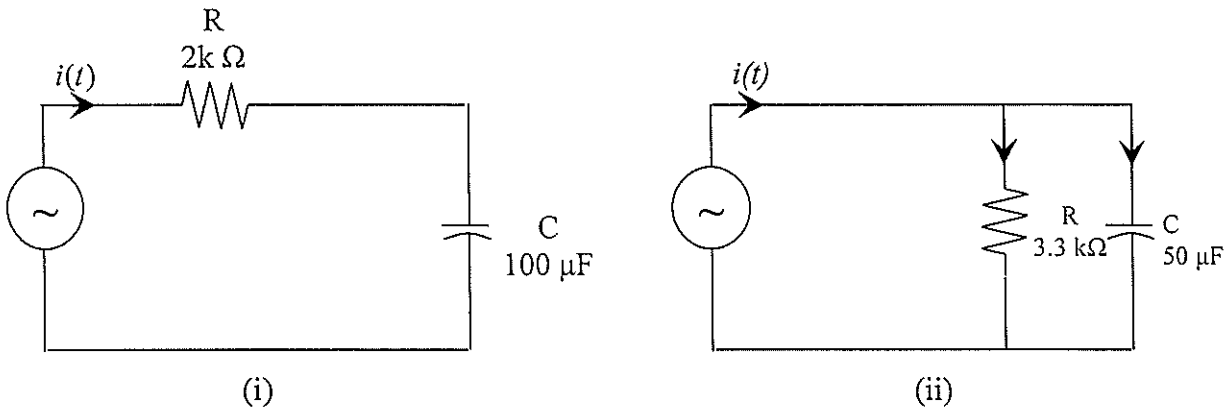

Figure 4

Continued...

QUESTION 4 [25 MARKS]

a) Define the following and state its unit.

i) Voltage

[2 marks]

ii) Current

[2 marks]

iii) Resistance

[2 marks]

iv) Energy

[2 marks]

v) Power

[2 marks]

b) Referring to Thevenin's Theorem, define the following:

i) V_{TH}

[2 marks]

ii) R_{TH}

[2 marks]

c) Circuit in Figure 5 has been in position **a** for a long time. At time $t = 0$ the switch is closed to position **b**.

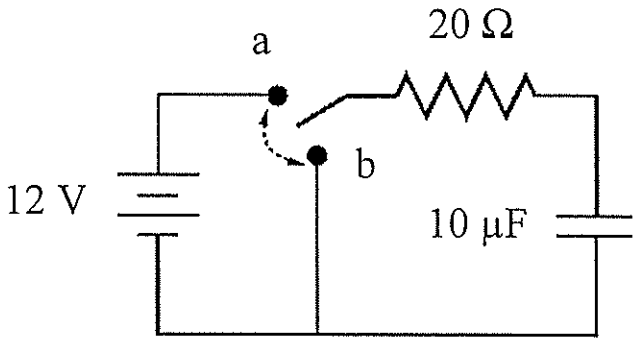

Figure 5

i) What is the current through the resistor just BEFORE the switch is closed ($t=0^-$)?

[2 marks]

ii) What is the current through the resistor just AFTER the switch is closed ($t=0^+$)?

[2 marks]

Continued...

iii) What is the charge across the capacitor just BEFORE the switch is closed ($t=0^-$)?

[2 marks]

iv) What is the charge on the capacitor just AFTER the switch is closed ($t=0^+$)?

[2 marks]

v) What is the charge on the capacitor at at time $t = 0.3$ ms after the switch is closed?

[3 marks]

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